

**The Economic Effects of the
Upper Mississippi River National Wildlife and Fish Refuge:
Baseline and Effects of Alternatives**

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Executive Summary

- ! Recreation visits to the **Upper Mississippi River NW&FR** and Refuge budget expenditures generate **significant local and regional economic effects**.
- ! In 2003, the **Upper Mississippi River NW&FR** accounted for **3.2 million visitor days**; boating, camping, and other beach-related uses accounted for 43 per cent of total visitor days; fishing accounted for 38.3 percent; wildlife observation for 9.7 percent; migratory waterfowl hunting for 8 percent; big game hunting for 0.7 percent and small game hunting for 0.3 percent.
- ! These visits resulted in **\$ 73.5 million in retail expenditures** in the nineteen-county area surrounding the Refuge.
- ! Total economic output associated with these expenditures amounted to **\$ 89.9 million**.
- ! Recreational use of the Refuge generated 1,173 **jobs** in the nineteen county area with job income of **\$ 19.7 million**.
- ! **Non-residents** (living outside the nineteen-county area) spent **\$ 27.8 million** in the local area resulting in **\$ 33.9 million** in economic output and **431 jobs** with labor income of **\$ 7.4 million**.
- ! Recreational use of the Refuge generated over **\$ 9.6 million** in Federal, state and local taxes.
- ! The **economic value** of the recreational use of the Refuge is estimated to be between **\$ 46 million and \$ 60 million** annually.
- ! **Refuge budget expenditures** average over **\$ 5 million** annually.
- ! **Refuge budget expenditures** generate **\$ 8.3 million** in economic output, **93 jobs** and over **\$ 1.7 million** in job income.
- ! Over **\$ 731,000** in Federal, state and local taxes are generated by Refuge budget expenditures.
- ! Considering both Refuge visitor and budget expenditures, the Refuge generates over **\$ 119 million** annually in expenditures and economic value, **\$98 million** in economic output, **1,266 jobs** with an income of **\$ 21.4 million** and federal, state and local taxes of **\$ 10.4 million**.
- ! Each dollar of Refuge budget expenditures generates **\$ 23.90** of economic effects and **\$2.08** of Federal ,state and local tax revenue.

Economic Effects of the Upper Mississippi River National Wildlife and Fish Refuge¹

From an economic perspective, the Upper Mississippi River National Wildlife and Fish Refuge (Upper Mississippi River NW&FR) provides a variety of environmental and natural resource goods and services used by people either directly or indirectly. The use of these goods and services may result in economic impacts to both local and state economies. The various services the Refuge provides can be grouped into five broad categories:

- \$ Maintenance and conservation of environmental resources, services and ecological processes;
- \$ Production and protection of natural resources such as fish and wildlife;
- \$ Production and protection of cultural and historical sites and objects;
- \$ Provision of educational and research opportunities;
- \$ Outdoor and wildlife-related recreation.

People who use the above services benefit in the sense that their individual welfare or satisfaction level increases with the use of a particular good or service. One measure of the magnitude of the change in welfare or satisfaction associated with using a particular good or service is *economic value*. Aside from the effect on the individual, use of the good or service usually entails spending money in some fashion. These expenditures, in turn, create a variety of economic effects collectively known as *economic impacts*. For this report, the term *economic effects* encompasses both economic value and economic impacts.

Economic value is the economic trade-off people would be willing to make in order to obtain some good or service. It is the maximum amount people would be willing to pay in order to obtain a particular good or service minus the actual cost of acquisition. In economic theory this is known as *net economic value* or *consumer surplus* (see 1) Freeman and 2) Boyle et al. for a more detailed discussion). In the context of this report, estimates of the economic value of particular recreational activities are used to determine the aggregate value of recreational use of the Upper Mississippi River NW&FR .

Economic impacts refer to employment, employment or labor earnings, industrial or economic output and federal, local, county and state tax revenue that occur as the result of consumer expenditures on refuge-related goods and services. For this report, two types of impacts are addressed: (1) impacts associated with annual consumer expenditures on Refuge-related recreation; and (2) impacts associated with Refuge budget

¹ Help and assistance from Eric Nelson and Cindy Samples, Upper Mississippi River National Wildlife and Fish Refuge, is gratefully acknowledged. Views expressed in this report do not necessarily represent those of the U.S. Department of the Interior or the Fish and Wildlife Service. Any and all errors of fact or interpretation are the sole responsibility of the author.

expenditures.

A comprehensive economic profile (baseline) of the Refuge and estimates of the economic effects of alternative management strategies would address all applicable economic effects associated with the use of refuge-produced goods and services. However, for those goods and services having nebulous or non-existent links to the market place, economic effects are more difficult or perhaps even impossible to estimate. Some of the major contributions of the Refuge to the natural environment, such as watershed protection, maintenance and stabilization of ecological processes, and the enhancement of biodiversity would require extensive on-site knowledge of biological, ecological and physical processes and interrelationships even to begin to formulate economic benefit estimates. This is beyond the scope of this report.

This report focuses on a limited subset of refuge goods and services, primarily those directly linked in some fashion to the marketplace, such as recreation use and Refuge budget expenditures. It should be kept in mind that the emphasis in this report on these particular market-oriented goods and services should not be interpreted to imply that these types of goods and services are somehow more important or of greater value (economic or otherwise) than the non-market goods and services previously discussed.

A comprehensive economic analysis of the Refuge would incorporate estimates of the total societal benefits and costs associated with the Refuge. For example, benefits would include not only the valuation of recreation and commercial use on the Refuge but also the valuation of the scientific knowledge and environmental education services provided by the Refuge and the valuation of an enhanced ecological environment. On the cost side, in addition to annual budget expenditures, the opportunity costs² of natural resources such as land and water and the costs of capital improvement would also be included (Loomis and Fix). However, because of time and resource constraints and the limited amount of available information, a comprehensive analysis as discussed above is beyond the scope of this study. Consequently, this report focuses on economic effects which can be estimated using currently available information. As a result, both benefits and costs as calculated in this report represent conservative, reconnaissance-level estimates of total social benefits and costs.

This report focuses on estimating baseline conditions associated with recreational and commercial use of the refuge and the economic impacts of alternative management strategies for the revised comprehensive management plan (CCP) currently being developed for the Upper Mississippi River NW&FR. three types of economic effects: (1) the economic impacts of recreation expenditures, which include the effects of expenditures on industrial output, employment, employment earnings and federal, state and local tax revenue; (2) the economic impacts of Refuge budget expenditures, including salary and non-salary expenditures; (3) the economic value of the recreational use of the Refuge defined as the net economic value or consumer surplus estimate of a recreational visitor day; (4) a summary of other non-recreational use of the Refuge and (5) a preliminary estimate of the economic effects of alternative management strategies.

Economic impacts of recreational expenditures

²

Opportunity costs represent foregone benefits of using the resources in their next best use.@ (Loomis and Fix, p. 4). For example, lake front property occupied by a Refuge could be used as a state park or residential development.

Spending associated with recreational use of the Refuge can generate a substantial amount of economic activity in local and regional economies. Refuge visitors spend money on a wide variety of goods and services. Trip-related expenditures may include expenses for food, lodging and transportation. Anglers, hunters, boaters and wildlife watchers also buy equipment and supplies for their particular activity. Because this spending directly affects towns and communities where these purchases are made, recreational visitation can have a significant impact on local economies, especially in small towns and rural areas. These direct expenditures are only part of the total picture, however. Businesses and industries that supply the local retailers where the purchases are made also benefit from recreation spending. For example, a family may decide to purchase a set of fishing rods for an upcoming vacation. Part of the total purchase price will go to the local retailer, say a sporting goods store. The sporting goods store in turn pays a wholesaler who in turn pays the manufacturer of the rods. The manufacturer then spends a portion of this income to cover manufacturing expenses. In this fashion, each dollar of local retail expenditures can affect a variety of businesses at the local, regional and national level. Consequently, consumer spending associated with Refuge recreation can have a significant impact on economic activity, employment, household earnings and local, state and Federal tax revenue.

Table 1 shows recreational use on the upper Mississippi River in the early 1990's. (U.S. Army Corps of Engineers 1993). The majority of recreation use occurs between Minneapolis – St. Paul, Minnesota and Rock Island, Illinois.

Table 1. Annual Recreational Activity in the Upper Mississippi River	
Total Trips	2.2 million
Number of Recreation Days	11.3 million
Number of People Taking Trips	5.5 million
Number of People Engaging in Different Forms of Recreation:	
Fishing	2,021,000
Boating	1,969,000
Hiking	1,318,000
Camping and Picnicking	510,000
Swimming	204,000
Hunting	149,000
Other	309,000

Table 2 summarizes annual recreation-related expenditures on the upper Mississippi River. Trip-related expenditures are for such things as lodging, restaurants, and gas. Durable good expenditures are primarily equipment expenditures for such things as fishing rods and reels, guns and ammunition for hunting, binoculars for wildlife observation, and tents, coolers and other camping equipment.

Table 2. Summary of Upper Mississippi River Recreational Expenditures	
Total Annual Trip-related expenditures	\$216 million
Total Annual Expenditures on Durable Goods	\$171 million
Total Annual Expenditures (trip-related and durable goods)	\$387 million

source: Carlson et al. 1995

Estimating the economic impacts of refuge-related recreation

Two types of information are needed to estimate the economic impacts of recreational visits to the refuge: (1) the amount of recreational use on the Refuge by activity; and (2) expenditures associated with recreational visits to the refuge. With this information, total expenditures for each activity can be estimated. These expenditures, in turn, can be used in conjunction with regional economic models to estimate industrial output, employment, employment income and tax impacts associated with these expenditures.

Refuge recreational use

In FY 2003, the Upper Mississippi River NW&FR accounted for 3,238,312 visitor days. Table 3 shows visitation by activity (only those activities with potential economic significance are shown; environmental education for example is not shown) and by District (Driftless Area is included with the totals for McGregor District). For the Refuge as a whole, boating and beach use accounted for 47 percent of total refuge recreational use; fishing for 33 percent; hunting 10 percent and wildlife observation for 11 percent (does not add to 100 percent because of rounding). .

Table 3. Upper Mississippi River NW&FR Recreational Use, FY 2003.					
Activity	Winona	La Crosse	McGregor	Savanna	Total
Wildlife Observation	142,600	101,820	48,551	14,042	307,013
Big Game Hunting	4,200	1,793	2,870	12,217	21,080
Small Game Hunting	3,000	1,182	3,430	2,472	10,084
Migratory Bird Hunting	58,500	23,456	78,045	93,538	253,539
Fishing	300,000	194,016	465,000	254,900	1,213,916
Boating	213,000	538,442	427,000	184,009	1,362,851
Total	721,300	860,709	1,024,896	561,178	3,168,483

Recreation expenditures

Expenditures used in this report were obtained from the **2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation** (U.S. Department of the Interior et al. 2002) . The figures in **Table 4** represent statewide averages for Region 3 for per person per day expenditures for the indicated activity. Resident refers to expenditures by in-state residents and non-resident refers to expenditures by out-of-state visitors. These expenditures include only **travel-related expenses**. It is assumed that these per day expenditures for the indicated activity are representative of recreation-related expenditures associated with Upper Mississippi River NW&FR. (note: boating expenditures were obtained from a nation-wide survey of boaters who used U.S. Army Corps of Engineers marina slips. See Michigan State University, 1998).

Table 4. Recreational Expenditures per Person per Day by Activity, Region 3 (2003 dollars)		
Activity	Resident	Non-Resident
Wildlife Observation	\$8.14	\$28.50
Big Game Hunting	\$15.25	\$49.28
Small Game Hunting	\$9.79	\$34.27
Migratory Game Hunting	\$15.49	\$21.27
Fishing	\$17.70	\$44.36
Boating	Day \$21.11	Overnight \$31.80

Economic impacts of recreation expenditures

Recreation on the Upper Mississippi River NW&FR results in significant economic impacts in the counties along the Refuge and river corridor. **Table 5** shows the counties included in each District study area. **Table 6** summarizes economic impacts from recreational use of the Refuge including the impacts of both local and non-local (resident and non-resident) visitation and expenditures and shows expenditures by recreational activity along with estimates of the economic output, employment and employment income associated with these expenditures. The impacts were estimated using regional input-output models³ constructed for each of the six recreational activities.

Table 5. Counties included in District Study Areas	
District	County
Winona	Buffalo WI Trempealeau WI Winona MN Wabasha MN
La Crosse	Houston MN Vernon WI La Crosse WI Winona MN Trempealeau WI
McGregor	Dubuque IA Clayton IA Allamakee WI Crawford WI Grant WI Houston MN Vernon WI
Savanna	Whiteside IL Carroll IL Jo Daviess IL Rock Island IL Dubuque IA Clayton IA Jackson IA Clinton IA Scott IA Grant WI

⁸

The economic impacts of recreational spending were derived using IMPLAN, a regional input-output modeling and software system. For additional information, see MIG, Inc., **IMPLAN System** and Olson and Lindall, **IMPLAN Professional Software, Analysis and Guide**.

Recreation visits to the Refuge resulted in expenditures of over \$73 million in the nineteen county area which resulted in economic output of \$89.9 million with an associated employment level of 1,173 jobs with a total income of \$19.7 million.

Table 6. Total Economic Impacts of Recreational Use: Upper Mississippi River NW&FR				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$4,063,292	\$4,968,614	68	\$1,071,484
Small game hunting	\$160,431	\$196,291	3	\$42,497
Big game hunting	\$501,106	\$619,673	8	\$142,627
Migratory bird hunting	\$4,542,451	\$5,609,297	76	\$1,268,309
Fishing	\$29,576,333	\$36,223,053	483	\$8,119,297
Boating	\$34,673,216	\$42,266,199	535	\$9,044,582
Refuge Totals	\$73,516,829	\$89,883,127	1,173	\$19,688,796

Tables 7 through 10 summarize the economic impacts by District (these are impacts which occur within the specified counties for a given District).

Table 7. Total Economic Impacts of Recreational Use: Winona District				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$1,886,375	\$2,221,300	29	\$422,341
Small game hunting	\$47,733	\$56,213	1	\$10,661
Big game hunting	\$99,788	\$118,199	2	\$23,188
Migratory bird hunting	\$991,270	\$1,172,562	16	\$229,461
Fishing	\$7,309,336	\$8,575,353	110	\$1,658,730
Boating	\$5,411,673	\$6,254,203	75	\$1,095,386
District Totals	\$15,746,175	\$18,397,830	233	\$3,439,767

Table 8. Total Economic Impacts of Recreational Use: La Crosse District				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$1,346,911	\$1,718,449	25	\$415,864
Small game hunting	\$18,806	\$23,888	1	\$5,714
Big game hunting	\$42,594	\$54,609	1	\$13,414
Migratory bird hunting	\$397,162	\$509,133	7	\$124,904
Fishing	\$4,727,081	\$6,004,356	85	\$1,469,264
Boating	\$13,678,997	\$17,053,161	224	\$3,877,307
District Totals	\$20,211,551	\$2,536,3596	342	\$5,906,467

Table 9. Total Economic Impacts of Recreational Use: McGregor District				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$642,251	\$796,784	11	\$176,570
Small game hunting	\$54,565	\$67,665	1	\$14,914
Big game hunting	\$68,481	\$85,356	1	\$19,218
Migratory bird hunting	\$1,321,485	\$1,645,549	24	\$369,603
Fishing	\$11,329,436	\$13,909,125	195	\$3,088,783
Boating	\$10,909,050	\$13,288,781	174	\$2,828,228
District Totals	\$24,325,268	\$29,793260	407	\$6,497,316

Table 10. Total Economic Impacts of Recreational Use: Savanna District				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$187,755	\$232,081	3	\$56,709
Small game hunting	\$39,327	\$48,525	1	\$11,208
Big game hunting	\$290,243	\$361,509	4	\$86,807
Migratory bird hunting	\$1,832,534	\$2,282,053	28	\$544,341
Fishing	\$6,210,480	\$7,734,219	94	\$1,902,520
Boating	\$4,673,496	\$5,670,054	63	\$1,243,661
District Totals	\$13,233,835	\$16,328,441	193	\$3,845,246

Total expenditures shows the total annual expenditures associated with the indicated recreational activity. The figures include spending by both residents (or locals who live in one of the 19 counties and non-residents (people who do not live in the nineteen county area).

Economic output (also known as *industrial output*) shows the total output generated by total recreation-related expenditures. Total output is the production value (alternatively, the value of all sales plus or minus inventory) of all output generated by recreation expenditures. Total output includes the direct, indirect and induced effects of these expenditures. Direct effects are simply the initial effects or impacts of spending money; for example, spending money in a grocery store for a fishing trip or purchasing ammunition or a pair of binoculars are examples of direct effects. The purchase of the ammunition by a sporting goods retailer from the manufacturer or the purchase of canned goods by a grocery from a food wholesaler would be examples of indirect effects. Finally, induced effects refer to the changes in production associated with changes in household income (and spending) caused by changes in employment related to both direct and indirect effects. More simply, people who are employed by the grocery, by the food wholesaler, and by the ammunition manufacturer spend their income on various goods and services which in turn generate a given level of output. The dollar value of this output is the induced effect of the initial (or direct) recreation expenditures⁴.

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More technically, direct effects are production changes associated with the immediate effects of changes in final demand (in this case, changes in recreation expenditures); indirect effects are production changes in those industries directly affected by final demand; induced effects are changes in regional household spending patterns caused by changes in regional employment (generated from the direct and indirect effects) Taylor et al. 1993, Appendix E, p. E-1)

The economic impact of a given level of expenditures depends, in part, on the degree of self-sufficiency of the area under consideration. For example, a county with a high degree of self-sufficiency (out-of-county imports are comparatively small) will generally have a higher level of impacts associated with a given level of expenditures than a county with significantly higher imports (a comparatively lower level of self-sufficiency). Consequently, the economic impacts of a given level of expenditures will generally be less for rural and other less economically integrated areas compared with other, more economically diverse areas or regions.

Jobs and job income include direct, indirect and induced effects in a manner similar to total industrial output. Employment includes both full and part-time jobs, with a job defined as one person working for at least part of the calendar year, whether one day or the entire year. Job income in the IMPLAN system consists of both employee compensation and proprietor income (MIG, Inc. 1999).

Table 11 shows total recreation expenditures and economic impacts for **non-resident** (non-local) visitors to the Refuge. Recreation-related expenditures by non-locals totaled \$27.8 million which generated \$33.9 million in economic output. These expenditures generated 431 jobs with an income of \$7.4 million.

Table 11. Total Economic Impacts of Non-Resident Recreational Use: Upper Mississippi River NW&FR				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$2,187,460	\$2,661,772	34	\$562,296
Small game hunting	\$86,510	\$105,357	1	\$22,454
Big game hunting	\$264,833	\$326,138	4	\$75,166
Migratory bird hunting	\$1,426,208	\$1,746,593	21	\$394,823
Fishing	\$13,472,811	\$16,416,083	211	\$3,597,282
Boating	\$10,383,661	\$12,653,736	160	\$2,702,665
District Totals	\$27,821,483	\$33,909,679	431	\$7,354,686

Tables 12 through 15 show the economic impacts of non-resident spending by District and by activity for each District.

Table 12. Total Economic Impacts of Non-Resident Recreational Use: Winona District				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$1,016,027	\$1,191,873	14	\$220,888
Small game hunting	\$25,815	\$30,319	0	\$5,621
Big game hunting	\$51,759	\$61,063	1	\$11,858
Migratory bird hunting	\$311,060	\$365,641	4	\$70,551
Fishing	\$3,327,309	\$3,879,160	50	\$716,250

Boating	\$1,626,635	\$1,880,894	23	\$330,104
District Totals	\$6,358,605	\$7,408,950	92	\$1,355,272

Table 13. Total Economic Impacts of Non-Resident Recreational Use: La Crosse District				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$725,465	\$918,247	12	\$218,028
Small game hunting	\$10,127	\$12,760	0	\$2,995
Big game hunting	\$22,185	\$28,211	0	\$6,876
Migratory bird hunting	\$124,719	\$158,002	2	\$38,397
Fishing	\$2,151,832	\$2,709,204	37	\$644,755
Boating	\$4,103,702	\$5,115,952	67	\$1,163,193
District Totals	\$7,138,030	\$8,942,376	119	\$2,074,244

Table 14. Total Economic Impacts of Non-Resident Recreational Use: McGregor District				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$345,921	\$427,411	6	\$93,342
Small game hunting	\$29,386	\$36,302	1	\$7,897
Big game hunting	\$35,362	\$43,760	1	\$9,769
Migratory bird hunting	\$414,974	\$510,632	7	\$113,367
Fishing	\$5,157,308	\$6,302,717	85	\$1,367,091
Boating	\$3,251,934	\$3,957,351	52	\$837,065
District Totals	\$9,234,885	\$11,278,173	150	\$2,428,531

Table 15. Total Economic Impacts of Non-Resident Recreational Use: Savanna District				
Activity	Expenditures	Output	Jobs	Income
Wildlife Observation	\$100,047	\$124,241	1	\$30,038
Small game hunting	\$21,182	\$25,976	0	\$5,941
Big game hunting	\$155,527	\$193,104	2	\$46,663
Migratory bird hunting	\$575,455	\$712,318	8	\$172,508
Fishing	\$2,836,362	\$3,525,002	41	\$869,186
Boating	\$1,401,390	\$1,699,539	19	\$372,303
District Totals	\$5,089,963	\$6,280,180	71	\$1,496,639

The economic impacts from recreation expenditures estimated in this report are gross District-wide impacts. Information on where expenditures may occur locally and the magnitude and location of resident and non-resident expenditures (resident and non-resident relative to the geographical area of interest) is not currently available. Generally speaking, non-resident expenditures bring \$outside\$ money into the area and thus generate increases in real income or wealth. Spending by residents is simply a transfer of expenditures on one set of goods and services to a different set within the same area. In order to calculate \$net\$ economic impacts within a given area derived from resident expenditures, much more detailed information would be necessary on expenditure patterns and visitor characteristics. Since this information is not currently available, the gross area-wide estimates are used as an upper-bound for the net economic impacts of total resident and non-resident spending in the nineteen county area. The economic impacts of non-resident spending in Table 11 represent a real increase in wealth and income for the 19-county area (for additional information, see Loomis p. 191 and U.S. Department of Commerce pp. 7-9).

Tax Revenue derived from Refuge Recreation Spending

Table 16 shows total Federal, state and local tax revenue derived from Refuge-related recreational spending in each District. **Table 17** shows tax impacts by activity for the Refuge as a whole. These estimates are based on tax regulations and policies in effect in 1998 (as specified in the 1998 IMPLAN data set).

**Table 16. Annual Federal, State and Local Tax Revenue Generated
by Total Refuge Recreational Spending: By District
(2003 dollars)**

District	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Winona	\$895,271	\$909,122	\$1,804,393
La Crosse	\$1,570,909	\$1,394,663	\$2,965,572
McGregor	\$1,672,107	\$1,451,561	\$3,123,668
Savanna	\$969,991	\$792,051	\$1,762,042
Refuge Total	\$5,108,278	\$4,547,397	\$9,655,675

**Table 17. Annual Federal, State and Local Tax Revenue Generated
by Total Refuge Recreational Spending: By Activity
(2003 dollars)**

Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$279,734	\$242,923	\$522,657
Small Game Hunting	\$10,968	\$9,361	\$20,599
Big Game Hunting	\$36,370	\$30,613	\$66,983
Migratory Bird Hunting	\$324,757	\$277,021	\$601,778
Fishing	\$2,094,216	\$1,790,595	\$3,884,811
Boating	\$2,362,233	\$2,196,614	\$4,558,847
Refuge Total	\$5,108,278	\$4,547,397	\$9,655,675

Tables 18 through 21 show tax revenue for each District broken out by recreation activity.

Table 18. Annual Federal, State and Local Tax Revenue Generated by Total Refuge Recreational Spending: Winona District (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$109,879	\$97,689	\$207,568
Small Game Hunting	\$2,778	\$2,550	\$5,328
Big Game Hunting	\$6,024	\$5,410	\$11,434
Migratory Bird Hunting	\$59,645	\$53,821	\$113,466
Fishing	\$431,100	\$382,390	\$813,490
Boating	\$285,845	\$367,262	\$653,107
District Total	\$895,271	\$909,122	\$1,804,393

Table 19. Annual Federal, State and Local Tax Revenue Generated by Refuge Recreational Spending: La Crosse District (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$110,250	\$95,377	\$205,627
Small Game Hunting	\$1,519	\$1,359	\$2,878
Big Game Hunting	\$3,555	\$3,121	\$6,676
Migratory Bird Hunting	\$33,102	\$29,119	\$62,221
Fishing	\$389,827	\$339,200	\$729,027
Boating	\$1,032,656	\$926,487	\$1,959,143
District Total	\$1,570,909	\$1,394,663	\$2,965,572

Table 20. Annual Federal, State and Local Tax Revenue Generated by Refuge Recreational Spending: McGregor District (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$45,329	\$38,449	\$83,778
Small Game Hunting	\$3,835	\$3,355	\$7,190
Big Game Hunting	\$4,930	\$4,254	\$9,184
Migratory Bird Hunting	\$94,842	\$81,960	\$176,802
Fishing	\$794,194	\$684,470	\$1,478,664
Boating	\$728,977	\$639,073	\$1,368,050
District Total	\$1,672,107	\$1,451,561	\$3,123,668

Table 21. Annual Federal, State and Local Tax Revenue Generated by Refuge Recreational Spending: Savanna District (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$14,276	\$11,408	\$25,684
Small Game Hunting	\$2,836	\$2,367	\$5,203
Big Game Hunting	\$21,861	\$17,828	\$39,689
Migratory Bird Hunting	\$137,168	\$112,121	\$249,289
Fishing	\$479,095	\$384,535	\$863,630
Boating	\$314,755	\$263,792	\$578,547
District Total	\$969,991	\$79,2051	\$1,762,042

Tables 22 and 23 summarize tax impacts from non-resident spending by District and by activity.

Table 22. Annual Federal, State and Local Tax Revenue Generated by Non-Resident Refuge Recreational Spending: By District (2003 dollars)			
District	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Winona	\$353,186	\$317,271	\$670,457
La Crosse	\$552,005	\$487,918	\$1,039,923
McGregor	\$625,462	\$539,381	\$1,164,843
Savanna	\$377,744	\$306,016	\$683,760
Refuge Total	\$1,908,397	\$1,650,586	\$3,558,983

Table 23. Annual Federal, State and Local Tax Revenue Generated by Non-Resident Refuge Recreational Spending: By Activity (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$147,073	\$128,478	\$275,551
Small Game Hunting	\$5,806	\$5,121	\$10,927
Big Game Hunting	\$19,187	\$16,143	\$35,330
Migratory Bird Hunting	\$101,186	\$86,216	\$187,402
Fishing	\$929,233	\$787,514	\$1,716,747
Boating	\$705,912	\$627,114	\$1,333,026
District Total	\$1,908,397	\$1,650,586	\$3,558,983

Tables 24 to 27 show non-resident tax impacts by District and by recreational activity.

Table 24. Annual Federal, State and Local Tax Revenue Generated by Non-Resident Refuge Recreational Spending: Winona District (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$57,555	\$51,445	\$109,000
Small Game Hunting	\$1,467	\$1,348	\$2,815
Big Game Hunting	\$3,082	\$2,768	\$5,850
Migratory Bird Hunting	\$18,339	\$16,390	\$34,729
Fishing	\$186,610	\$164,930	\$351,540
Boating	\$86,133	\$80,390	\$166,523
District Total	\$353,186	\$317,271	\$670,457

Table 25. Annual Federal, State and Local Tax Revenue Generated by Non-Resident Refuge Recreational Spending: La Crosse District (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$57,949	\$50,479	\$108,428
Small Game Hunting	\$799	\$719	\$1,518
Big Game Hunting	\$1,827	\$1,612	\$3,439
Migratory Bird Hunting	\$10,205	\$8,985	\$19,190
Fishing	\$171,428	\$148,177	\$319,605
Boating	\$309,797	\$277,946	\$587,743
District Total	\$552,005	\$487,918	\$1,039,923

Table 26. Annual Federal, State and Local Tax Revenue Generated by Non-Resident Refuge Recreational Spending: McGregor District (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$23,993	\$20,450	\$44,443
Small Game Hunting	\$2,034	\$1,786	\$3,820
Big Game Hunting	\$2,509	\$2,186	\$4,695
Migratory Bird Hunting	\$29,145	\$25,350	\$54,495
Fishing	\$352,040	\$299,934	\$651,974
Boating	\$215,741	\$189,675	\$405,416
District Total	\$625,462	\$539,381	\$1,164,843

Table 27. Annual Federal, State and Local Tax Revenue Generated by Non-Resident Refuge Recreational Spending: Savanna District (2003 dollars)			
Activity	Federal Tax Revenue	State and Local Tax Revenue	Total Tax Revenue
Wildlife Observation	\$7,576	\$6,104	\$13,680
Small Game Hunting	\$1,506	\$1,268	\$2,774
Big Game Hunting	\$11,769	\$9,577	\$21,346
Migratory Bird Hunting	\$43,497	\$35,491	\$78,988
Fishing	\$219,155	\$174,473	\$393,628
Boating	\$94,241	\$79,103	\$173,344
District Total	\$377,744	\$306,016	\$683,760

Economic Value of Refuge Recreation

Table 28 shows the net economic value (consumer surplus) of recreational activities on the Refuge. Two economic value estimates are used, **mean** and **low**. With the exception of the values for big game hunting and fishing, the per day values in **Table 28** were obtained from Walsh et al., which summarized 287 estimated economic values from 120 studies from 1968 to 1990 (big game hunting and fishing values were obtained from the 2001 Fishing, Hunting and Wildlife Recreation Survey [see U.S. Department of the Interior et al. 2002]). This report gave both a mean and a range of values for a variety of recreational activities. **Mean Estimate** refers to the mean value for all studies for a particular activity. **Low Estimate** refers to the low value of the high-low range for all studies for a particular activity.

Table 28. Annual Net Economic Value of Refuge Recreation (Year 2003 Dollars)

Activity	Activity Days	Net Economic Value per Day	Net Economic Value per Day	Total Net Economic Value	Total Net Economic Value
		Mean Estimate	Low Estimate	Mean Estimate	Low Estimate
Big game	21,080	\$24.13	\$24.13	\$508,660	\$508,660
Small game	10,084	\$21.25	\$12.91	\$214,285	\$130,184
Migratory waterfowl	253,539	\$24.57	\$11.43	\$6,229,453	\$2,923,304
Fishing	1,213,916	\$17.24	\$17.24	\$20,927,911	\$20,927,911
Wildlife Observation	307,013	\$15.30	\$3.64	\$4,697,299	\$1,117,527
Boating	1,362,851	\$20.00	\$15.00	\$27,257,020	\$20,442,765
Totals	3,168,483	--	--	\$59,834,628	\$46,050,351

Economic and Tax Impacts of Refuge Budget Expenditures

In addition to recreation expenditures, refuge budget expenditures also contribute to local and regional economies. **Table 29** summarizes the economic impact of both salary and non-salary budget expenditures.

Separate input-output models were used to estimate the impacts of local spending, regional (in-state but not local), and out-of-state spending for both salary and non-salary expenditures. Salary and non-salary expenditures are based on the inflation-adjusted three year average of Refuge expenditures from 2001 to 2003

Table 29. Annual Economic Impact of Refuge Budget Expenditures
(based on annual average Refuge budget, 2001-2003. 2003 dollars)

Area	Expenditures	Economic Output	Jobs	Labor Income
Salary Impacts				
19 county area	\$1,255,659	\$1,469,121	18	\$266,375
5 state area	\$270,786	\$497,803	5	\$110,382
U.S.	\$655,127	\$1,386,201	16	\$377,280
Total Salary Impacts	\$2,181,572	\$3,353,125	39	\$754,037
Non-Salary Impacts				
19 county area	\$1,870,444	\$2,188,419	27	\$396,909
5 state area	\$396,663	\$713,993	7	\$131,868
U.S.	\$967,471	\$2,047,098	20	\$456,908
Total Non-Salary Impacts	\$3,234,578	\$4,949,510	54	\$985,685
Total Impacts	\$5,416,150	\$8,302,635	93	\$1,739,722

Total Refuge budget averaged about \$5.4 million from 2001 to 2003. This budget generated over \$8 million in economic output resulting in 93 jobs with a total income of over \$1.7 million.

Table 30 shows the tax revenues generated by Refuge budget expenditures for each of the three spending areas and by salary and non-salary expenditures.

**Table 30. Annual Tax Revenue derived from Refuge Budget Expenditures
(based on annual average budget, 2001-2003. 2003 dollars)**

Area	Federal Taxes	State and Local Taxes	Total Taxes
Salary Tax Revenue			
19 county area	\$87,896	\$81,618	\$169,514
Five state area	\$18,955	\$17,601	\$36,556
U.S.	\$45,858	\$42,583	\$88,441
Total Salary Tax Revenue	\$152,709	\$141,802	\$294,511
Non-Salary Tax Revenue			
19 county area	\$130,931	\$121,579	\$252,510
Five state area	\$27,766	\$25,783	\$53,549
U.S.	\$67,723	\$62,886	\$130,609
Total Non-Salary Tax Revenue	\$226,420	\$210,248	\$436,668
Total Tax Revenue	\$379,129	\$352,050	\$731,179

Recreation and Refuge Budget Impacts Summary

Over and above the major contributions of the Upper Mississippi River NW&FR to wildlife and fisheries conservation, the recreational use of the Refuge and the spending of Federal budget dollars results in a significant amount of related economic activity. **Tables 31** and **32** summarize these effects. Total economic effects (defined here to be expenditures plus net economic value) average about \$125 million annually.

Table 31. Annual Economic Effects Summary for Upper Mississippi River NW&FR

Source	Expenditures	Economic Value	Total Economic Effects
Recreation	\$73,516,829	\$46,050,351	\$119,567,180
Refuge Budget	\$5,416,150	na	\$5,416,150
Total	\$78,932,979	\$46,050,351	\$124,983,330

Table 32 summarizes economic output, jobs, income and total tax revenue generated by Refuge recreation and budget expenditures. Economic output averages over \$98 million annually with 1,266 jobs and almost \$21 million in job-related income. Local, state and federal taxes generated by this economic activity average about \$10.4 million annually.

Table 32. Economic Impact Summary for Upper Mississippi River NW&FR

Source	Output	Jobs	Income	Total Taxes
Recreation	\$89,883,127	1,173	\$19,688,796	\$9,655,675
Refuge Budget	\$8,302,635	93	\$1,739,722	\$731,179
Total	\$98,185,762	1,266	\$21,428,518	\$10,386,854

Commercial Use of the Refuge

Commercial use of the Refuge consists of hunting, wildlife observation and fishing guides, commercial trappers, recreational fish float operators and commercial fishing. Farming, grazing and timber harvesting have a minimal impact on the Refuge.

Guides

A number of guides operate on the Refuge, providing services for anglers, hunters and wildlife observers. In recent years, the Refuge has averaged about 15 guides operating on the Refuge per year. Specific information on the number of clients, party size and client expenditures for guide services is not available, but it is estimated that each guide is engaged for about 30 – 40 trips per year. Guides must pay \$100 for an annual permit from the Refuge.

Commercial Trapping

In 2003, 225 trappers spent an average of 23.4 days each trapping on the Refuge. Most of the animals trapped are muskrats. Trap tags must be purchased annually to trap on the Refuge. Annual revenue from trap tag sales has averaged about \$4,000 in recent years. In fiscal year 2001, a total of 20,520 muskrats were trapped on the Refuge. At a price of \$3.13 per pelt (North American Fur Auction, May 2002 auction; 2003 dollars), gross revenue for the trappers amounted to \$64,213.

Fish Float Operators

There are currently four fish float operators within Refuge boundaries. About 15,000 anglers per year use the floats with the largest operator servicing about 6,000 anglers per year while the remaining operators average about 3,000 anglers each per year. Float operators charge about \$10 per day on average to access the floats, consequently gross revenue for the four fish float operators ranges from between \$10,000 to \$44,000 annually. Float operators are required to purchase an annual special use permit from the Refuge for \$100.

Commercial fishing

About 20 species of fish plus turtles are caught commercially within Refuge boundaries. For pools 4 – 14 from 1998 to 2001, annual commercial catch averaged 6.6 million pounds with a gross value based on ex vessel price (the price paid to the commercial fisher dockside; i.e., before any processing or distribution) per pound of \$1.7 million (2003 dollars). Commercial catch of turtles averaged 8,475 pounds annually with a gross value of \$4,553. The annual number of commercial fisherman averaged 534 for a gross revenue per fisherman of \$3,307.

Economic Effect of CCP Alternatives

Hunting

Alternatives B and D result in a 10 percent increase in hunting visitation on the Refuge. Alternative C results in a 15 percent increase in hunting visits. Table 33 shows the change from the baseline, Alternative A, for each of the proposed alternatives.

Table 33. Annual Economic Effects of CCP Alternatives: Hunting				
		Change from Alternative A		
Impacts	Alt. A	Alt. B	Alt. C	Alt. D
Visitors	263,623	26,362	39,544	26,362
Expenditures	\$ 5,203,988	\$ 520,399	\$ 780,598	\$ 520,399
Economic Output	\$ 6,425,261	\$642,526	\$ 963,789	\$ 642,526
Jobs	87	9	13	9
Job Income	\$1,453,433	\$145,343	\$ 218,015	\$ 145,343
Federal and State Taxes	\$ 689,090	\$ 68,909	\$ 103,364	\$ 68,909

Fishing

Alternative B results in a 5 percent decrease in angling visits to the Refuge; Alternative C results in a 10 percent increase in angling visits, and Alternative D results in a 5 percent increase in angling visits.

Table 34. Annual Economic Effects of CCP Alternatives: Fishing				
		Change from Alternative A		
Impacts	Alt. A	Alt. B	Alt. C	Alt. D
Visitors	1,213,916	- 60,696	121,392	60,696
Expenditures	\$ 29,576,333	- \$ 1,478,817	\$2,957,633	\$ 1,478,817

Economic Output	\$ 36,223,053	- \$ 1,811,153	\$ 3,622,305	\$ 1,811,153
Jobs	483	- 24	48	24
Job Income	\$ 8,119,297	- \$ 405,965	\$ 811,930	\$ 405,965
Federal and State Taxes	\$ 3,884,811	- \$ 194,241	\$ 388,481	\$ 194,241

Wildlife Observation and Photography

Alternative B results in no change for the current situation; Alternative C results in a 20 percent increase in wildlife observation visits and Alternative D also results in a 20 percent increase in wildlife observation visits of the Refuge.

Table 35. Annual Economic Effects of CCP Alternatives: Wildlife Observation				
		Change from Alternative A		
Impacts	Alt. A	Alt. B	Alt. C	Alt. D
Visitors	307,013	0	61,403	61,403
Expenditures	\$ 4,063,292	0	\$ 812,658	\$ 812,658
Economic Output	\$ 4,968,614	0	\$ 993,723	\$ 993,723
Jobs	68	0	14	14
Job Income	\$ 1,071,484	0	\$ 214,297	\$ 214,297
Federal and State Taxes	\$ 522,657	0	\$ 104,531	\$ 104,531

Recreational Boating, Camping, and Other Beach-related Uses

Alternative B results in 10 percent increase in silent sport (kayaks and canoes) visitation on the Refuge and a 15 percent decrease in camping on the Refuge (Silent sport visits currently account for about 1 percent of total boating visits to the Refuge). Alternative C results in a 15 percent increase in silent sport visits and has no impact on camping and other beach-related uses. Alternative D also results in a 15 percent increase in silent sport visits and has no impact on camping and other beach –related uses. Table 36 summarizes the economic impacts of the alternatives for these activities.

Table 36. Annual Economic Effects of CCP Alternatives: Recreational Boating, Camping and other Beach-related Uses				
		Change from Alternative A		
Impacts	Alt. A	Alt. B	Alt. C	Alt. D
Visitors	1,362,851	- 203,065	2,044	2,044
Expenditures	\$ 34,673,216	- \$5,166,309	\$ 52,010	\$ 52,010
Economic Output	\$ 42,266,199	- \$6,297,664	\$ 63,400	\$ 63,400
Jobs	535	- 80	1	1
Job Income	\$9,044,582	- \$1,347,643	\$ 213,567	\$ 213,567
Federal and State Taxes	\$ 4,558,847	- \$ 679,268	\$ 6,838	\$ 6,838

Table 37 summarizes the economic effects of the alternatives on Refuge recreation use. Alternative B has the largest negative effect, resulting in a loss of over 237,000 visitors with a spending decrease of \$6.1 million in the nineteen county area. Alternative C would result in an increase in visitation of 224,383 with expenditures increasing by \$4.6 million. Alternative D would result in a visitation increase of 150,505 with expenditures increasing by \$2.86 million.

Table 37. Summary of Annual Economic Effects of CCP Alternatives on Recreational Use				
		Change from Alternative A		
Impacts	Alt. A	Alt. B	Alt. C	Alt. D
Visitors	3,168,483	- 237,399	224,383	150,505
Expenditures	\$ 73,516,829	- \$ 6,124,727	\$ 4,602,899	\$ 2,863,884
Economic Output	\$ 89,883,127	- \$ 7,466,291	\$ 5,643,217	\$ 3,510,802
Jobs	1,173	- 95	76	48
Job Income	\$ 19,688,796	- \$ 1,608,265	\$ 1,457,809	\$ 979,172
Federal and State Taxes	\$ 9,655,675	- \$ 804,600	\$ 603,214	\$ 374,519

Adjacent land owners

Land owners adjacent to the Refuge may benefit economically from owning property next to the Refuge. A recent report (Boyle et al. 2002) shows that land and property values are typically higher for properties next to a Refuge, when holding other factors constant. For example, a four-bedroom, two bath house on a quarter acre lot increases in value as the distance from the Refuge decreases. For the four refuges included in the report, property values increased from \$351 to \$7,469 per mile as distance to the refuge decreased. The report states (Boyle et al. p. 19):

The significant premium people pay to purchase properties near refuges clearly indicates that [refuges] provide desirable environmental amenities and permanent open space to local residents.

As property value increases, taxes would be expected to increase also. While this may result in increased revenue for the county, it does increase the tax burden for adjacent land owners. However, based on several townships included in the report, the annual tax increase of properties adjacent to refuges is fairly small, with annual tax increases averaging between \$88 and \$112 per home.

Since the alternatives would not radically change current management direction, it is not anticipated that any of the alternatives would have a significant effect on property values in general or on the desirability of owning or buying property adjacent to the Refuge.

Furbearer trapping

Under all alternatives, a new furbearer trapping plan would be completed by 2007. Until the plan is completed, it is unknown whether it would result in an increase, decrease or no change in the current level of trappers and furbearer harvest on the Refuge. Thus, the economic effects outside of the current trapping program are unknown at this time. A separate environmental assessment will be done with the trapping plan and the economic effects evaluated at that time.

Commercial fishing

Alternatives B and D would result in a 10 percent increase in commercial fishing within Refuge boundaries. Alternative C would have no impact. A 10 percent increase in catch would result in an annual increase of \$170,000 in total ex vessel value for commercial fishing in pools 4 – 14. This assumes no change in ex vessel prices and catch success rate.

Other permit-required activities (guides)

Alternative B would eliminate all guide activity on the Refuge. This would result in significant economic loss for guides and could result in a small decline in the number of visitors to the Refuge. Alternatives C and D would result in a 10 percent increase in guide activity with commensurate increases in guide revenue and possibly slight increases in Refuge visitation. Information is not currently available to quantitatively estimate changes in guide revenue and related economic impacts to counties or Districts.

Marinas and other Water-related business

Alternatives B, C and D would have minimal economic effects on marinas and other water-related businesses.

Forest Management

Alternatives B and D may slightly impact currently allowable harvest levels on the Refuge but the economic impact would be minimal.

Fishing Floats

Alternative B would eliminate all four fish floats currently operating on the Refuge. It is estimated that the four current float operators gross about \$125,000 a year. Alternative B, besides eliminating the floats, could result in a decline of angling visits to the Refuge (to the extent that anglers who can no longer use the fish floats would choose to fish somewhere other than the Refuge). Alternative C would allow one more fish float with a commensurate increase in total operator revenue and a possible increase in angling visits to the Refuge. Alternative D would maintain the current four fish floats.

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